5 | RETHINKING SKILLS POLICY FOR THE AI ERA

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Much has been made of the negative impact of technologies such as robotics and artificial intelligence for the workforce. But technology, used well, can be a power for huge social and economic good. We must rethink approaches to policy-making to better understand how the UK's strengths in AI could supercharge the economy and bring new opportunities for employment.

Just as the original Luddites failed to stop changes in the cotton and wool mills in the 19th century, we must not now try to hold back the tide of technological change. It is often stated by economists, including at The Work Foundation, Deloitte, the OECD and others, that each technological advancement has created more jobs than it has destroyed. Whilst this may be true, there is a wider imperative here. Political parties must get real and think smarter and more collectively about how to mediate new challenges and opportunities posed by new technologies – whether that be on data ethics, government-industry collaboration or funding environments.

Of particular importance is making sure we have the right policy frameworks in place to harness talent in this new era. New technologies like artificial intelligence (AI) and robotics are good news for both people and GDP, and the dual mission of creating a world-leading talent base

in these areas whilst mediating the impact of robotics and AI on the wider workforce must be at the heart of future skills policy.

Why technology is good news

The dawn of robotics and AI bring with them important potential social and economic gains. They can boost productivity, economic growth and, if implemented and shaped correctly, personal and societal wellbeing. All countries will want to seize these benefits, and with estimates indicating a global opportunity of nearly $50tn in the next 10 years, it is critical for the UK's ongoing competitiveness that these technologies and the companies behind them have an encouraging policy environment here in the UK.

For companies, that environment is just as much about wanting to locate and invest in areas bursting with talented people who can think creatively and keep pace with the latest projects and products in their companies.

The UK has a great track record with its world-leading universities, but it's time to break open the education model to ensure people right across the country, and not just those who have attended university, have the opportunity to work for and even found companies which represent some of the best economic news on the planet.

There have been a wide array of predictions for how AI will develop over the next decade, ranging from AI being used as a tool to aid relatively simple processes (which some refer to as 'narrow AI') to robots being developed with humanlike mental capabilities (which is often referred to as 'general purpose or strong AI'). As Sir Nigel Shadbolt, founder of the world wide web, has stated, "What we really have in AI is a whole spectrum of abilities, from programs that are smart but they are not smart like us, to programs that are super clever in specific areas".

The course of this parliament will see a major shift in the growth of AI, towards the next phase of machines that make choices on their own. Self-learning machines can adapt to situations and make decisions without the aid of human intervention, such as in the case of self-driving cars. The recent win in the Chinese strategy game Go by Google's DeepMind technology, developed in London, against the reigning world champion is seen as a ground-breaking step forward in the development of AI technologies, helping to drive global recognition of the UK's leadership.

The evolution of robotics and AI will play an increasingly significant role in our daily lives. Whether the impacts are positive or negative will depend, to a sizable extent, on the decisions and actions that technologists, businesses, researchers, policy makers and governments take over the next few years. If existing jobs are phased out, augmented, or new roles created, then it is the role of policy makers to work hard to understand this. All countries will need to think deeply about the policy interventions and steps needed to ensure that they are beneficiaries of these changes that are happening globally. UK policy-making has no option but to keep pace with technological change – the change is global, but our policy responses can be national, regional and local as well as European and international, enabling UK people, as workers, as citizens, as consumers, to gain from these advancements.

Policy makers must make it a top priority to facilitate a policy environment which is successful in two areas. Firstly, creating access to a world-leading talent base for the development, adoption and exploitation of robotics and AI. Second, mediating the impact of robotics and AI on the wider workforce where existing jobs may be at risk of partial or full-automation.

Creating access to a world-leading talent base

The UK's ongoing potential in tech and the digital economy must be matched with a robust and growing talent pipeline to realise the full opportunities of the digital economy. As Baroness Martha Lane-Fox, Lord Knight and others have repeatedly argued, the digital skills gap is one of the most urgent policy challenges facing the UK. Recent estimates suggest the UK is already losing a potential of £2bn a year from unfilled roles requiring digital skills – the scale of the growing gap over the next decade cannot be underestimated as new technologies such as robotics and AI are developed and adopted.

Robotics and AI workers are in very high demand, in areas such as software development, systems design, engineering, programming and data science, all of which have been reported areas of domestic shortage right across tech firms in the UK. Robotics and AI systems are complex and interdisciplinary, requiring a broad range of knowledge, understanding and skills. Companies are crying out for more people that have skills in logical thinking, reasoning skills, mathematics, computational linguistics, programming, and engineering.

Leadership in artificial intelligence and robotics is directly linked to leadership in higher education and academic excellence. The UK is good at this stuff, and despite uncertain economic times ahead, we must continue to prioritise investment in pure science, advanced mathematics and the value of pure research.

Policy makers must look closely at how the UK ensures that the world's future AI talent wants to come and study at our leading universities – that means a smart migration policy which attracts and welcomes the very best from the EU and across the world. The closure of the post-study work visa and wider government policy on migration risks sending that talent to competitor countries. International talent in our universities raises our own departments' game and UK academic talent rises with it.

The UK must be able to compete in the 'global race', and this has never been truer in a post-Brexit world. We must radically rewire our school system for these jobs. Whilst efforts such as the introduction of the new computing curriculum are good strides forward, we must get serious about the scale of change needed to equip our young people to thrive in these new industries.

At this year's SXSW conference, President Obama committed to invest $4bn in computer science teaching. By comparison, the UK government is committing less than £4m into training for the delivery of the new computing curriculum. And only half of ICT and computing teachers surveyed by Nesta in 2014 reported they were confident in their ability to teach the computing curriculum. Maggie Philbin was right in her 2015 digital skills review for then Labour leader Ed Miliband that this needs to be dramatically stepped up. If we don't get this part of the skills pipeline right from primary school age, we risk missing out on a generation of girls and boys who will be key in helping the UK fulfil its AI and robotics promise in new types of fulfilling, high-value roles.

Mediating the impact on the wider workforce

Whilst there are differing views on the impact of robotics and AI on the wider UK labour market, we can be certain that the nature of many jobs will change. For example, the rise in the use of systems will see many repetitive tasks being delivered by autonomous machines. This is a fundamental issue that must be addressed so that the UK can prepare for such a future, and should be a top priority for policy makers. For example, Andy Haldane, chief economist at the Bank of England, has suggested that 15 million jobs in the UK are at risk of automation by smart machines over the next 20 years.

Deloitte recently published *Transformers: How Machines are Changing Every Sector of the UK Economy*, which outlines the potential impact of automation on each sector and region of the economy, and examines how automation and technological advance have impacted jobs growth and creation within these sectors.

The headline findings of this work are valuable in assessing these risks. The sector with the highest number of jobs with a high risk of automation was wholesale and retail, with 2,168,000 jobs with a high chance of being automated in the next two decades. This was followed by transport and storage at 1,524,000 jobs, and human health and social work at 1,351,000 jobs. Manufacturing saw the largest net decline in jobs over the 15 year period with 720,000 jobs lost, 90 per cent of which were those with a high chance of automation. This was followed by wholesale and retail – 338,000 jobs lost, 71 per cent with a high chance of automation – and professional, scientific and technical roles, which lost 269,000 jobs.

The Deloitte research is, on the whole, positive about what the development of new technologies such as robotics and AI will mean for job creation. The research also offers a number of fascinating insights regionally. The sectors with the highest levels of predicted job growth in the coming years are health and social work, education, and scientific and technical roles which add a combined 650,000 jobs. It is through these kinds of insights that targeted policy interventions can play a role in supporting people through their working lives against a backdrop of huge changes to the structure of the workforce.

The increased adoption of robotics and autonomous systems in the workplace will lead to a change in how we interact with technology at work. As we move into this period of change it is important that a realistic and constructive dialogue is maintained on the opportunities and challenges this could bring. It does not have to be the case

that technology will replace people but rather how could AI, robotics and autonomous systems free up human resources so that they can be used more productively and generate more value.

Skills and education will be crucial to ensuring the UK is able to realise the full opportunities of these technologies as well as manage potential risks. The wider education system will have a key role to play in helping and supporting people, of all ages, to be equipped with the skills needed as automation means that roles are augmented or new roles created. This also applies to those already in the workforce who will need to retrain and upskill in order to adapt and exploit the new technology-driven careers and job opportunities that will be created. Employers right across the economy, not just the tech sector, need to be responsible in helping their workforce adapt and respond to these changes.

This is where we need more radical thinking on where current drives such as the apprenticeship levy can be better focused on development throughout careers and better geared for the jobs of the future. At present, initiatives such as the levy risk a race to the bottom – a blunt policy instrument which will struggle to keep pace and provide flexibility to the most dynamic and innovative parts of the economy. Employers as never before will have a stake in lifelong learning and talent development programmes, and we need a policy environment which encourages good corporate behaviour for the period ahead.

No easy answers – but the time is now to rethink skills policy for the era of robotics and AI

The shift in the skills base and training needs is one of the biggest challenges facing policy-makers and wider industry over the next decade – whether it is creating the talent pool to support a world-leading environment for robotics

and AI, or mediating the implications of changes in the labour market brought about by new technologies.

Smart, pragmatic policy-making must look hard for new answers on how best to support people whose jobs may be vulnerable to automation or augmentation in the coming decade. This need not be a story of doom and gloom, but it does need heavy doses of evidence-based realism. Matthew Hancock MP, in his capacity as cabinet office minister, spoke regularly of the 'smarter state' – but what might the notion of the smarter welfare state look like from the perspective of the individual in this age? Better and more targeted policy-making – with smarter interventions based on new insights and projections – can enable existing workers and those entering the labour market to be better equipped with the skills to adapt and thrive in this digital age *for life*.